REMARKS

Entry of this Amendment if proper because it narrows the issues on appeal[illegible]oes not require further search by the Examiner.

Claims 1-14 and 24-31, 33-34, 36-37 and 39 are all the claims presently p[illegible] in the application. Claims 32, 35 and 38 have been canceled. Claims 1, 5-7, 10, 24-25, [illegible], 34 and 37 have been amended to more particularly define the invention.

It is noted that the claim amendments are made only for more particularly [illegible]ng out the invention, and not for distinguishing the invention over the prior art, narrowing th[illegible]ns or for any statutory requirements of patentability. Further, Applicant specifically states [illegible] amendment to any claim herein should be construed as a disclaimer of any interes[illegible] right to an equivalent of any element or feature of the amended claim.

Claims 24 and 25 stand rejected under 35 U.S.C. § 102(a) as being anticip[illegible]y Chon et al. "Fatigue free samarium-modified bismuth titanate film capacitors having a lar[illegible]ntaneous polarizations". Claims 1-3, 5-8, 10, and 13 stand rejected under 35 U.S.C. § 103[illegible]being unpatentable over Haukka et al. (U.S. Patent No. 2002/0115252). Claims 4, 9, 1[illegible]nd 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Haukka et al.[illegible]s 11, 12, and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Haukk[illegible]. Claims 31-39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Haukk[illegible] in view of Chon et al.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention is directed to a data storage element which includ[illegible]bstrate including a semiconductor material, a metal oxide layer including an electrically [illegible]ting rare earth metal oxide disposed upon a surface of the substrate, the metal oxide layer [illegible]g a predetermined current-voltage profile under an applied voltage and forming an a[illegible]lement of the data storage element, a conductive material disposed upon the metal oxide la[illegible]first electrode electrically connected to the conductive material, and a second electroc[illegible]nected to

the substrate, to form the data storage element.

Conventional data storage elements use metal films for accumulating char ., as an active element). However, such devices have high charging voltage requirements e charge retention times are short (Application at page 1, line 10-page 2, line 5).

The claimed invention, on the other hand, includes a metal oxide layer inc an electrically insulating rare earth metal oxide disposed upon a surface of the substr e metal oxide layer having a predetermined current-voltage profile under an applied volt d forming an active element of the data storage element (Application at Figures 4-5). This the claimed data storage element to provide a low charging voltage requirement and charge retention time (Application at page 11, lines 5-14).

II. THE PRIOR ART REFERENCE

A. The Chon, et al. Reference

The Examiner alleges that Chon teaches the claimed invention of claims Applicant submits, however, that there are elements of the claimed invention wh neither taught nor suggested by Chon.

Chon discloses a $Bi_{3.15}Sm_{0.85}Ti_3O_{12}$ (BSmT) thin film grown on $Pt/TiO_2/S$ (100) substrates using the method of metalorganic sol decomposition. In addition, Cho loses a BsmT capacitor allegedly showing good charge–retention characteristics (Chon tract).

However, Chon does not teach or suggest "*a metal oxide layer comprisi lectrically insulating rare earth metal oxide disposed upon a surface of said substrate, said oxide layer comprising a predetermined current-voltage profile under an applied volt d forming an active element of said data storage element*", as recited, for example, in clai

As noted above, unlike conventional data storage elements which use m ms for accumulating charge (e.g., as an active element), the claimed invention, include al oxide layer which includes an electrically insulating rare earth metal oxide disposed u surface of

the substrate, and having a predetermined current-voltage profile under an applied ge and forming an active element of the data storage element (Application at Figure 1). llows the claimed data storage element to provide a low charging voltage requirement and a charge retention time (Application at page 11, lines 5-14).

For example, in one particular embodiment, the metal oxide layer may be d on a substrate and an electrode formed on the metal oxide layer (e.g., see Application a re 1). Specifically, in this embodiment, when a voltage is applied between the first and electrodes, beyond a threshold voltage, charge is accumulated in the metal oxide l hereby shifting current-voltage and capacitance-voltage characteristics, and upon reversa e applied voltage, beyond a threshold voltage, the charge in the metal oxide layer is dischar hereby restoring original current-voltage and capacitance-voltage requirements (Applica page 11, lines 5-14).

More specifically, the metal oxide layer of the claimed invention has a pr mined current-voltage profile under an applied voltage (Application at Figures 4-5; page e 9-page 9, line 23). This allows the claimed device to be used as a memory device.

Clearly, these novel features are not taught or suggested by Chon. Indeed, Examiner has not even alleged that Chon taught or suggested this feature.

In fact, Chon merely discloses a BSmt film which forms a dielectric layer apacitor (e.g., see Chon at Figure 2). However, nowhere does Chon teach or suggest the oxide layer of the claimed invention, which has a predetermined current-voltage profile unde pplied voltage, and which forms an active element of a data storage element.

Therefore, Applicant submits that there are elements of the claimed inve hat are not taught or suggest by Chon. Therefore, the Examiner is respectfully requested to aw this rejection.

B. The Haukka, et al. Reference

The Examiner alleges that Haukka makes obvious the invention of claim and 28-30. In addition, the Examiner alleges that Haukka would have been combined v hon to

form the claimed invention of claims 31-39. Applicant submits, however, that the [redacted]rences would not have been combined and even if combined, the combination would not [redacted]or suggest each and every element of the claimed invention.

Haukka discloses aluminum oxide and lanthanide layers, particularly form[redacted]an atomic layer deposition (ALD) type process, which serve as interface layers betwe[redacted]o or more materials. The interface layers are intended to prevent oxidation of a substrate and [redacted]nt diffusion of molecules between the materials (Haukka at Abstract).

However, Applicant submits that these references would not have been co[redacted]d as alleged by the Examiner. Indeed, these references are directed to different proble[redacted]l solutions.

Specifically, Chon is directed to BSmt film for a capacitor, whereas Hauk[redacted]herely directed to dielectric interface (e.g., aluminum oxide) films. Therefore, these refe[redacted]are completely unrelated, and no person of ordinary skill in the art would have consid[redacted]ombining these disparate references, absent impermissible hindsight.

Further, Applicant submits that the Examiner can point to no motivation [redacted]gestion in the references to urge the combination as alleged by the Examiner. Indeed, cont[redacted]the Examiner's allegations, neither of these references teach or suggest their combin[redacted] Therefore, Applicant respectfully submits that one of ordinary skill in the art wou[redacted]have been so motivated to combine the references as alleged by the Examiner. Theref[redacted]e Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Haukka, nor Chon, nor any combination thereof teache[redacted]ggests "*a metal oxide layer comprising an electrically insulating rare earth metal oxide di[redacted] upon a surface of said substrate, said metal oxide layer comprising a predetermined cur[redacted]oltage profile under an applied voltage and forming an active element of said data stor[redacted]ment*", as recited, for example, in claim 1.

As noted above, unlike conventional data storage elements which use me[redacted]ns for accumulating charge (e.g., as an active element), the claimed invention, includes [redacted]al oxide layer which includes an electrically insulating rare earth metal oxide disposed up[redacted]urface of

the substrate, and having a predetermined current-voltage profile under an applied ge and forming an active element of the data storage element (Application at Figure 1). llows the claimed data storage element to provide a low charging voltage requirement and a charge retention time (Application at page 11, lines 5-14).

Specifically, the metal oxide layer of the claimed invention has a predeter current-voltage profile under an applied voltage (Application at Figures 4-5; page 8, line 9, line 23). This allows the claimed device to be used as a memory device.

Clearly, these novel features are not taught or suggested by Haukka. Inde ukka merely discloses high-k dielectric films. That is, nowhere does Haukka teach or s t the metal oxide layer of the claimed device.

Specifically, Haukka may disclose an aluminum oxide or a lanthanide oxi r (e.g., Haukka at Figure 4; paragraph [0060]. However, nowhere does Haukka teach or s t a metal oxide layer which forms an active layer in a data storage element. Indeed, nowhe s Haukka teach or suggest a metal oxide layer formed on a substrate, and having a predeter current-voltage profile under an applied voltage. Therefore, Haukka does not make up fo deficiencies of Chon.

As noted above, Chon does not teach or suggest these features. Therefor n clearly does not make up for the deficiencies of Haukka.

Therefore, Applicant submits that these references would not have been c ed and even if combined, the combination would not teach or suggest each and every ele of the claimed invention. Therefore, the Examiner is respectfully requested to withdra rejection.

IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-14 and 24-31, 3 36-37 and 39, all the claims presently pending in the application, are patentably distinct ove rior art of record and are in condition for allowance. The Examiner is respectfully request ass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition fo vance, the

Examiner is requested to contact the undersigned at the local telephone number li low to discuss any other changes deemed necessary in a telephonic or personal interview

The Commissioner is hereby authorized to charge any deficiency in fees o edit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 12/31/03

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing Amendment was filed by facsimile wit nited States Patent and Trademark Office, Examiner Bradley Smith, Group Art Unit # at fax number (703) 872-9306 this 31st day of December, 2003.

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